NEW CRETACEOUS FOSSILS FROM NEW GUINEA

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With a Contribution on a New Ammonite Genus

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Plates xxiv-xxvi and text fig. 1-5

ABSTRACT

Mollusca including the ammonite *Chimbuites sinuosocostatus* gen. et sp. nov., *Pleuromya cuneata* sp. nov. and several species previously known from Australia are described from the Albian of Papua and New Guinea. Two new Trigonias, a dimitobelid belemnite and a new species of tubicolous worm *Rotularia* are described from the Cenomanian. An introduction summarizes new data on the Cretaceous of New Guinea which have become known during the last decade.

INTRODUCTION

Much progress has been made in the study of Cretaceous sediments and fossils in the Australian part of New Guinea since they were last reviewed (Glaessner 1943, David 1950). The main results of the new discoveries can be summarized as follows: (1) greater extent and completeness of the Cretaceous record, (2) confirmation and extension of Australian relations of the faunas, and (3) zoning of facies according to tectonic environment. Any approach to detailed biostratigraphy of this large and little-known area can only be gradual and detailed zonal correlation of Cretaceous strata is not yet possible. It should be based on detailed zonal collecting from continuous fossiliferous sequences which could not be carried out because of difficulties of terrain and tectonics. Nevertheless, the identification of a number of fossils has led to age determinations which though necessarily somewhat vague and provisional, have added to the record of Cretaceous geological history of the area.

The Cretaceous commences in New Guinea with basal Lower Cretaceous (*Infravalanginian*) shales, with a fauna corresponding to that of the Lochambel beds at the top of the Spiti shales in the Himalaya. It includes *Haplophylloceras strigile* (Blanford), a distinctive species which is also well known from the Sulu Islands and from Western New Guinea. It was found recently in Papua, in the vicinity of the Kereru Range. The Infravalanginian Zone ammonite *Subthurmannia boissieri* (Pictet) has been recorded by Spath (1952, p. 23) from this locality.

The presence of higher *Neocomian* cannot be as clearly demonstrated. The absence of well-dated faunas of this age is, however, less likely to be due to regional non-deposition than to lack of suitable facies or to local erosion prior to a transgression of the Aptian or Albian. Evidence of such a transgression was found in the headwaters of the Fly River (Osborne 1945).

The *Aptian* is not represented by distinctive molluscan faunas. The genera *Maccoyella* and *Peratobelus* which are abundant in the Aptian of Australia have not been found in New Guinea and the ammonite tentatively identified as *Deshayesites* is shown by Casey to represent a new genus of Albian affinities. Assemblages of smaller foraminifera suggesting Aptian age occur but are not yet sufficiently well known to permit definite correlations.

The *Albian* is well represented but has not yet been zoned. Australian affinities are now well established though other elements are also present in the Albian fauna of New Guinea. Among them are *Ptychomya* and *Nerinea* (Glaessner 1945), and *Puzosia*.

The foraminiferal fauna of the Albian of New Guinea contains a number of well-known European and North American species, in addition to some from the Great Artesian Basin and others from the Carnarvon Basin (Western Australia).

In the *Cenomanian*, affinities can be established only with the northern and western fringes of the Australian continent (Melville and Bathurst Islands, Carnarvon Basin), as the Great Artesian Basin does not contain marine deposits of this age. Such affinities have been found among the foraminifera and mollusca but further discussion has to be deferred until the Australian Cenomanian faunas are described.

The following Table summarizes the known faunal relations:

	New Guinea	Australia
Pseudavicula papyracea[1]	Alb.	Alb.
Aucellina gryphaeoides	Alb.	[2]
Pleuromya cuneata	Alb?	—
Linotrigonia (Oistotrigonia) lima	Cen.	[2]
"Trigonia" papuana	Cen.	[2]
Cymatoceras hendersoni	Alb.	Alb.
Cymatoceras sp.	Cen.	—
Chimbuites sinuosocostatus	Alb.	—
Puzosia cf. planulata	Alb.	—
Myloceras davidi	Alb.	Alb.
Myloceras cf. flindersi	Alb.	Alb.
Labeceras trifidum	Alb.	Alb.
Parahibolites blanfordi[1]	Alb.	—
Dimitobelus (Tetrabelus) macregori	Alb.-Cen.	[2]
Rotularia spirulaeoides	Cen.	—

The Chimbu Cretaceous sequence on the north flank of the Kubor Anticline[3] is characteristic of a distinctive tectonic zone which Edwards and Glaessner (1953, p. 111) recognised as geosynclinal. They referred to it as miogeosynclinal while Rickwood (1955, p. 81) considers it as "more nearly eugeosynclinal than miogeosynclinal". There is agreement on the necessity of assuming more mobile belts to the north and east of the area, with volcanic islands as a source of the abundant volcanic component, while a relatively stable area was situated to the south and west. In this area the Albian and Cenomanian fossils here described were collected from greensands and calcareous shales. These

(1) See Glaessner 1945. (2) Similar species or subspecies in the Albian of the Great Artesian Basin.

(3) This section is included in the area studied by Rickwood (1955) who found further fossils and revised the stratigraphy. He mapped the *Kondaku Tuffs* (Lower Cretaceous) and the overlying *Chim Group* (*Maril Shales* and *Chimbu Tuffs* of Edwards and Glaessner), pointing out that its subdivisions are recognizable only in the Chim Valley and that it is "probably not wholly Upper Cretaceous" as ammonites found by natives in this vicinity and described below as Albian came from its base. There is of course no reason why the rock-stratigraphic Kondaku/Chim boundary used in mapping should coincide with the chronological Albian/Cenomanian boundary. The top of the Chim Group is probably not younger than Cenomanian (or Turonian) rather than "a record of uninterrupted sedimentation from the uppermost Cretaceous . . . to Eocene" as Edwards and Glaessner had thought possible. Rickwood has found that not only one but all limestone "lenses" with Eocene foraminifera included in the upper part of Noakes's section below the main Eocene scarp are slump blocks and that Cretaceous fossils, including *Dimitobelus macgregori* (Glaessner) occur only 1,500 feet below the top of the Chim Group.

sediments are probably an eastward extension of the Albian-Cenomanian Feing Group (Osborne 1945, Glaessner 1945) of the Upper Fly River area 200 miles to the west-north-west, which they resemble.

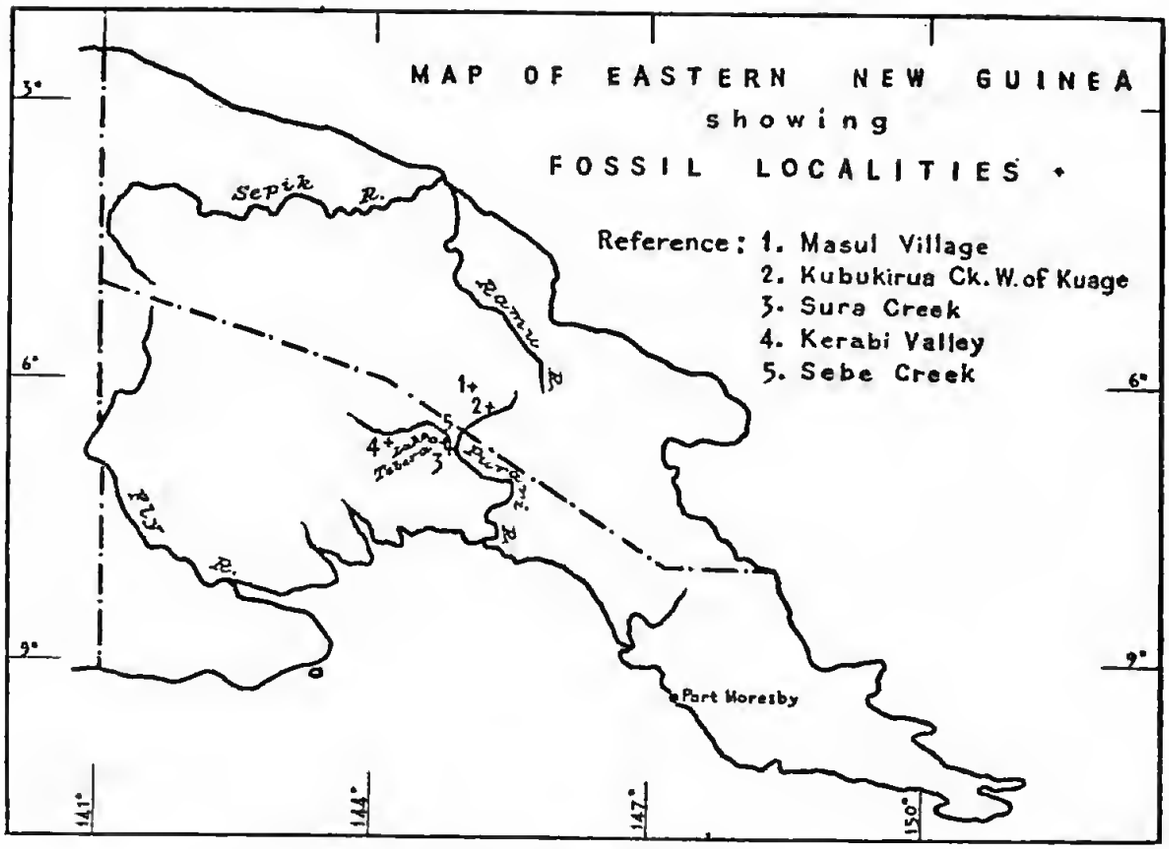

Fig. 1 Locality map.

It is probable that the fossils described from a less altered portion of a phyllitic greywacke series (Kaindi Schists) near Wau in New Guinea (Glaessner 1949) are also of Albian or Cenomanian age. The genera *Cliona, Cucullaea, Glycymeris, "Trigonia", Cardium, Vulsella, Inoceramus* and *Tibia?* have been recognised. These rocks represent a regionally metamorphosed zone of the mid-Cretaceous geosyncline of New Guinea.

The localities of most of the described species are shown on the accompanying map (fig. 1) which was kindly made available by the Australasian Petroleum Company.

Holotypes of the new species are in the palaeontological collection of the University of Adelaide. Paratypes are in the South Australian Museum. Other examined specimens have been returned to the private collection of the Australasian Petroleum Company.

ACKNOWLEDGEMENTS

The author is indebted to the Australasian Petroleum Company for permission to describe these fossils and to publish this paper; to Dr. P. E. Kent, Mr. W. D. Mott, Mr. F. K. Rickwood and Mr. G. A. V. Stanley, who collected or obtained the fossils and supplied information, and to the Departments of Geology of the Universities of Melbourne and Queensland, and the Australian Museum (Sydney) for the loan of specimens. The Australasian Petroleum Company provided the drawing of text fig. 1; Miss A. M. C. Swan assisted in the drafting of the other text figures, and Miss M. J. Wade (University of Adelaide) photographed most of the specimens.

DESCRIPTIONS

Aucellina gryphaeoides (Sowerby)

Plate xxiv, fig. 1a-b and text fig. 2

Avicula gryphaeoides J. de C. Sowerby, Trans. Geol. Soc., ser. 2, vol. 4, 1836, pp. 156, 335, pl. 11, fig. 3.

Aucellina gryphaeoides Pompeckj, N. Jahrb. Min. etc., Beil.-Bd. 14, 1901, pp. 354, 365, pl. 16, fig. 6-8.

Aucellina gryphaeoides H. Woods, Mon. Cretac. Lamellibr. England vol. 2, pt. 2, Palaeontogr. Soc. 1905, p. 72, pl. 10, fig. 6-13.

Aucellina gryphaeoides hughendenensis (*non* Etheridge), Edwards and Glaessner, Proc. Roy. Soc. Vict., vol. 64, 1953, p. 98.

Material and occurrence: Two left valves and one right valve from Kubukirua Creek, west of Kuage Village, Eastern Highlands of New Guinea, about 5 miles northeast of Wahgi-Purari junction (Coll. G. A. V. Stanley). One left valve from Sura Creek, east-south-east of Lake Tebera, Papua (Coll. F. K. Rickwood).

Remarks: The specimens from New Guinea agree remarkably well in shape, curvature, and ornamentation with the English species, two specimens of which from the Cambridge Greensand were kindly forwarded for comparison by Dr. L. R. Cox, of the British Museum (Natural History). In the right valve the height is slightly less than the length and the radial ribs are more pronounced on the surface of the internal mould. In the left valve the proportions and curvature of the umbo are identical with those of the English form.

A comparison was made with specimens from the Tambo Formation of Queensland (Granada and Ilfracombe) of the species described by Etheridge as *Avicula hughendenensis*. R. Etheridge Jr. in Jack and Etheridge. 1892, p. 461), remarks that *A. gryphaeoides* differs from the Australian form in having a much larger umbo in the left valve, "and the general characters of the right valve are quite different." The first of these statements can be confirmed, the second is of questionable value. Pompeckj noted the longer auricle of the left valve and the radial sculpture. These distinguishing characters are of minor importance compared with differences between other species of the genus and may therefore be considered as subspecific. Only the somewhat more pronounced radial sculpture is seen in the New Guinea specimens which are thus closer to the English form. On examination of further material from with the very wide geographic range of the species,

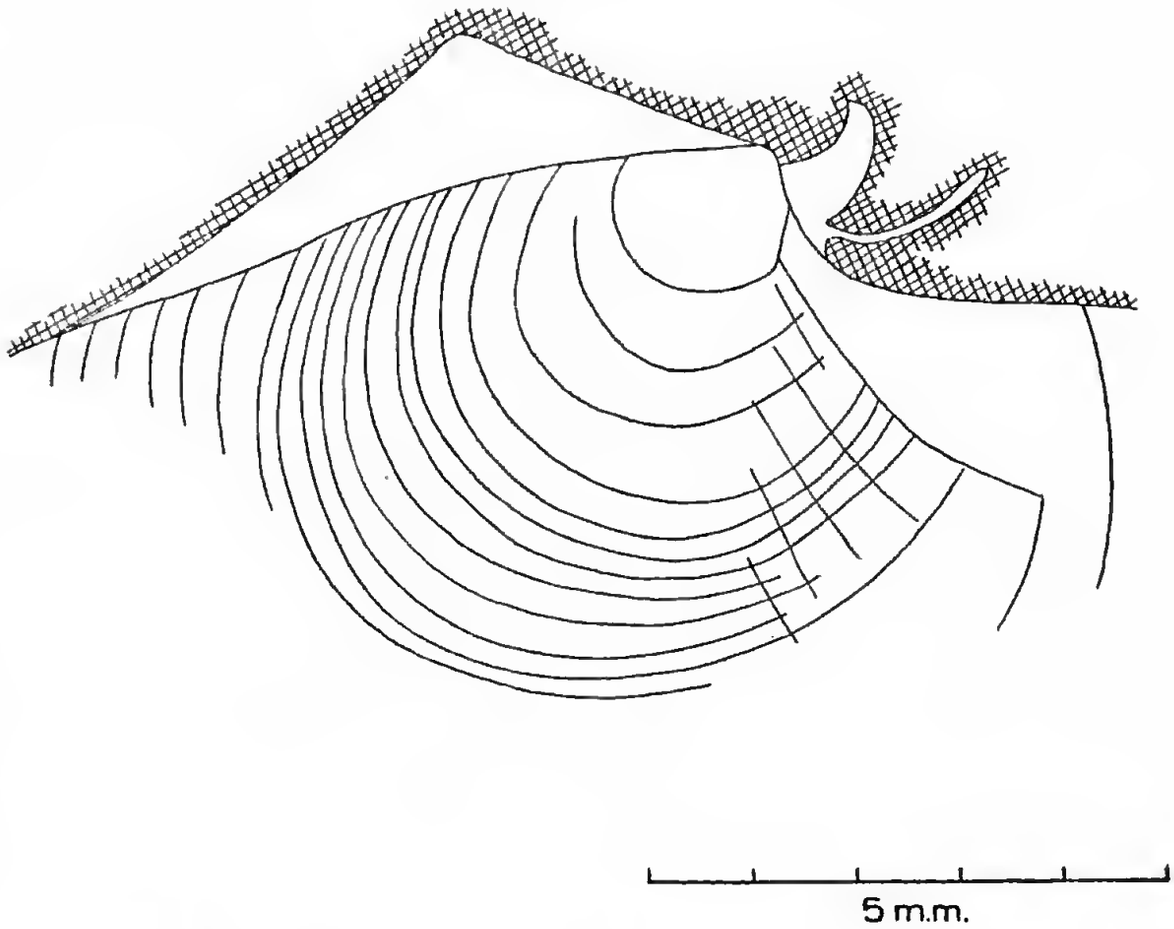

Fig. 2. *Aucellina gryphaeoides* (Sowerby). Enlarged view of the proximal portion of right valve (pl. 1 fig. 1b), camera lucida drawing showing outline of complete posterior and fragmentary anterior auricle.

they may be found to constitute another subspecies. The characters of the umbo and auricles are, however, definitely as in the English form to which the present specimens are therefore referred.

A. incurva Etheridge from the Albian of Darwin, *A. euglypha* Woods from the Albian of New Zealand, *A. parva* (Stoliczka) from the Cenomanian of Southern India and *A. radiatostriata* (Bonarelli and Nagera) from the Upper Aptian of South Georgia are clearly specifically different, the last-named differing in the much stronger radial sculpture, the less projecting umbo and the less strongly developed posterior part of the left valve (see Wilckens 1947).

Age: It is difficult to reach a definite conclusion about the stratigraphic range of this species and allied forms. Woods (1905) listed it from the Upper Gault, the Cambridge Greensand, and the Cenomanian up to the zone of *Holaster subglobosus*. Gillet (1924) also includes in this species d'Orbigny's *Inoceramus coquandi* (Upper Aptian). Pompeckj (1901) considers the identity of this species with *A. gryphaeoides* as "very probable" but points out that it has not been properly described. D'Orbigny's type figure does not show the characteristic shape of the umbo of the English form. An Aptian age of any typical *gryphaeoides* does not seem to be well established. Neither has it been figured from the Upper Cenomanian. In the Caucasus it was listed by Renngarten from the Upper Albian where it occurs stratigraphically above the Lower Albian *A. caucasica* Abich. *A. gryphaeoides* is therefore to be considered as mainly an Upper Albian form, possibly extending into the Lower Cenomanian (Woods, Pompeckj). Earlier and later references require confirmation. *A. g. hughendenensis* is according to Whitehouse restricted to the Middle and Upper Albian Tambo Formation of Queensland and its equivalents in South Australia. H. O. Fletcher collected many fine specimens of this subspecies at Onepah Station, about 30 miles N.N.E. of Tibooburra, New South Wales (Australian Museum, Nrs. F: 42149, 42155-7, 42169-70, 42179, 42208, 42215, 42219).

Linotrigonia (Oistotrigonia) lima sp. nov.

Plate xxv, fig. 7a-b and 8-9

Material: Holotype (Adelaide University Geol. Dept. No. F15324) showing both valves in apposition, partly concealed by hard sandy matrix. Paratype, a left valve, carinal portion and umbo broken but surface well exposed by weathering. Also about 10 external and internal moulds and fragments (Coll. F. K. Rickwood).

Diagnosis: Flank ribs mostly gently curved, bearing long, stout, close-set spines; area very wide, covered with numerous small blunt tubercles which are arranged to form oblique curved costae diverging from the flank ribs at an angle of about 60-70° in the young and about 40° on the adult shell.

Description: Shell thick, broadly elliptical in outline, but with a straight, relatively short postero-dorsal margin. Umbo small, very slightly projecting. Area wide, almost flat; marginal carina obtuse, straight. In young specimens the area is covered with numerous crenulated costae which are straight near the carina and bend upward near the dorsal margin. In the adult the areal costae break up into numerous small blunt tubercles giving the area a distinctive rasp-like surface. Flank ribs reaching the ventral margin at an angle of about 70-80°; they are very gently curved, separated by wider spaces, about 10 with a few short antero-ventral intercalations. There are 7-8 additional anterior flank ribs, diverging sharply from the main ribs towards the anterior margin which they reach at right angles. The main and some of the anterior costae are at first covered with and later in ontogeny break up into long stout close-set spines. The chevron-like divergence of areal and flank ribs on the marginal carina is well marked, particularly in young stages (pl. xxv, fig. 9), but in the adult the areal costae are much weaker than the flank ribs and growth lines become increasingly well marked. The costae are seen on the internal surface of the valves as broad depressions. The interior margin is crenulated. Teeth and buttress well developed, with fine dental crenulations, but not well preserved.

Measurements: Length 41 mm., height 31.3 mm., length of carina about 40 mm. (holotype), maximum thickness 28.5 mm. Length of paratype about 37 mm.

Comparison: This species resembles closely the form described as *Trigonia* (*Acanthotrigonia*) *phyllitica* Glaessner (1949), from the sheared and partly contact-metamorphic greywacke-phyllite complex of the Kaindi Group in the Morobe District of New Guinea. Since then Cox (1952) has revised the taxonomy of the Trigoniidae and has removed the "spinose scabrae", to which both this and the new species belong, from *Acanthotrigonia* (now placed in the synonymy of *Pterotrigonia*), to form a new subgenus *Oistotrigonia*. This is a far more satisfactory grouping. *Linotrigonia* (*Oistotrigonia*) *phyllitica* (Glaessner) differs from the new species in the ornamentation of the area which is covered with fine but distinct ribs becoming obsolescent near the

lateral edge. The flank ribs appear to have been sharper and are covered with "small protuberances". While these observed differences make it impossible to place the present material in *L.* (*O.*) *phyllitica*, the discovery of better preserved material of this species must be awaited before their significance can be fully evaluated. In other species of the subgenus the flank ribs swing forward much more strongly, the spines are less distinct, and the area is not as closely papillate.

Occurrence: East of Lake Tebera, Papua; common in dark green glauconitic sandstone, with *Dimitobelus macgregori*, *Dentalium* sp., gastropods, and other lamellibranchs.

Age: While the subgenus *Oistotrigonia* occurs throughout the Cretaceous and is therefore unsuitable for detailed age determination, the association of the new species with other mollusca unlike those from the Lower Cretaceous of New Guinea point to a probable Cenomanian age. This does not conflict with local stratigraphic observations.

Remarks: Another species of *Trigonia* (*sensu lato*) occurs in the Purari Greywackes. It has a small area and numerous flank ribs which are vertical in the median part. The available material does not permit detailed description and identification.

"Trigonia" papuana sp. nov.

Plate xxvi, fig. 1a-b

Material: (1) Holotype: Right valve, almost complete but with the umbonal portion worn smooth (Queensland University Geol. Dept. No. F17914, coll. W. D. Mott, loose in stream gravel in outcrop area of Cretaceous sandstones); (2) Fragment of calcareous matrix (Queensland Univ. Geol. Dept. No. F17915) containing two almost complete left valves and numerous fragments. Worn. Coll. W. D. Mott; (3) Fragmentary right valve. Coll. R. A. Woodward; (4) Rock fragment measuring about 1½ x 2 x 3 inches containing remains of at least twelve valves forming a shell breccia (lumachelle). Coll. R. A. Woodward.

Description: Shell thick, triangular to pentagonal in outline, length equalling height, almost equilateral, moderately convex. Anterior margin straight, ventral margin convex, postero-ventral angle obtuse, posterior and postero-dorsal margins straight and subequal in length. Umbo broadly rounded, worn in all available specimens.

Area wide, moderately convex, with a very faint median furrow and weak concentric growth lines. Marginal carina well developed in the holotype, rounded, with a shallow furrow between it and the area and a wider and deeper sulcus along its anterior side. Both sulcus and carina appear to be variable, the sulcus being better developed in the paratype specimens in which the carina is not as clearly visible as in the holotype.

Umbonal portion of the valve smooth, showing only faint growth lines, the beginning of the median ridge, and the sulcus. Anterior and ventral part of the valve ornamented with concentric ridges (8 in the holotype). They take an arcuate course from the anterior margin of the valve to the anterior border of the sulcus where they end abruptly, or to the ventral margin. The surfaces of the first two ridges are smooth to undulating, the later ones are covered with close-set rounded knobs becoming more distinct and numerous on the younger costae and varying in size.

Hinge teeth of right valve long and strong, finely crenulated.

Comparison: This species belongs to a rather obscure and uncommon group of Trigoniidae. Some of its distinctive characters occur in a somewhat vague manner in some of the specimens described by Woods (1917) as *T. hanetiana* d'Orbigny from the Senonian of Amuri Bluff, New Zealand. Among them are the subtriangular outline, the carina and sulcus, and the oblique arcuate trend of the costae (see particularly pl. 9, fig. 4). In the new species there is no indication of the divergent short anterior ribs which form an angle with the main ribs in most of the specimens figured by Woods. The valves are not elongate in outline, the tubercles on the ribs are different in shape and size, and the sculpture of the area is much weaker in the New Guinea species. The New Zealand form does not agree entirely with the typical South American *T. hanetiana* which is even less like the new species. *T. obtusa* Hupé was included by Woods in the synonymy of *T. hanetiana* as "a short form". I was unable to see figures or descriptions of this form in the literature at my disposal.

Taxonomic position: Marwick (1932) erected a new genus *Pacitrigonia* in which he placed *T. hanetiana* d'Orbigny, *T. explecta* Wilckens, and his new species *P. sylvesteri*. In these Upper Senonian species the oblique sculpture is weak while in the new species it is dominant. Other differences are the oblong, inequilateral shape and the obscure carina in *Pacitrigonia*. Among the new genera and subgenera described by Cox (1952), *Buchotrigonia* (*Syrotrigonia*) shows

the closest resemblance but according to the generic diagnosis the costae are non-tuberculate. The correct generic and subgeneric position of this species must therefore remain undecided until more material becomes available and publications which are at present inaccessible to the writer can be consulted.

Occurence: Kerabi Valley, north-west of Mt. Murray, Papua.

Age: Cenomanian, greensands with *Mantelliceras* and other Acanthoceratids.

Pleuromya cuneata sp. nov.

Plate xxiv, fig. 2a-c

Pleuromya n. sp., Edwards and Glaessner, Proc. Roy. Soc. Vict., vol. 64, 1953, p. 64.

Holotype: Adelaide University Geol. Dept. No. F15300.

Material: 19 specimens, with both valves in apposition.

Diagnosis: Shell thin, ornamented with conspicuous concentric folds varying in strength, with occasional irregular fusion of adjoining folds in the central part of the shell. Folds bluntly triangular in cross section, with a gentler ventral slope. Fine growth lines on and between folds. Umbones situated between one-third and a half of the shell length from the anterior end, incurved, not prominent. Anterior end short, broadly and evenly rounded, posterior end narrowed. Greatest height either in front of or at the umbo. Posterior sulcus weak in some specimens, absent in others. Posterior gape moderate.

Measurements:

Spec.	Length	Height	Max. thickness	Ant. distance of umbo
a	69	46	36	30.5
b (Holotype)	67	47.5	33.5	24
c	64+	46	30.5	35
d	52	36	27	21.2
e	50.5	35	25	20.5
No. 194 (Erni)	56.5	40.5	28.5	22

Description: In all specimens both valves are preserved, with some of the thin shell adhering to the cast. Some are partly enclosed in hard calcareous nodules. The hinge is not exposed but after cutting a specimen sagittally a small tooth-like projection was found under the umbo of the left valve. The external ligament and strong nymphs are clearly visible. One or two specimens show faint traces of the deep

pallial sinus which appears to end below the umbo. In eight specimens the right valve is slightly larger or at least higher at the umbo and hinge than the left valve. In three specimens the valves and their heights are equal. The valves taper strongly and evenly towards the narrowly rounded posterior margin and the thickness of the shell decreases along an almost straight line from its maximum which is anterior to the umbo. This gives the shell a pronounced wedge shape in both lateral and dorsal views. There is a slight variation in the position of the umbo, in the strength of the folds, and in the posterior sulcus which is faintly visible in only five of the specimens. There is no anterior ridge or other radial sculpture.

Remarks: The new species shows all features recently enumerated in the diagnosis of *Pleuromya* (Arkell 1934), with the exception of details of the hinge structure which are not clearly visible in closed shells. *P. cuneata* differs from *P. alduini*, the type species, in its much straighter ventral margin bringing the greatest height almost below the umbo. It resembles closely and appears to be congeneric with *P. borealis* Warren from the Albian of the Mackenzie River Valley, Canada (Warren 1947). Specific differences are seen in the narrow umbo and in the anterior end being more evenly rounded and sharply angular in dorsal view. The posterior gape is wider.

Occurrence: The exact localities at which this species occurs are not known. The present specimens were collected by natives near Masul Village, on a tributary of the Chimbu River, about three miles east-south-east of Chimbu, Eastern Highlands of New Guinea, together with specimens of *Chimbuites sinuosocostatus* and a few other species. Two further specimens were obtained by a missionary from natives living in the north-eastern slopes of the Bismarck Mountains, about 25 miles north-west of Chimbu. These were used by members of the Gende tribe as magic stones in connection with their gardening. It is probable that the specimens from the Chimbu area were collected by the natives for similar purpose but it is unlikely that all the specimens came from the same source as there is little intercourse between the tribes in this area, and similar rocks are known to occur at both localities. The specimens from the Gende tribal area were briefly described by Erni (1944, p. 474) as "*Pleuromya* or *Panopaea*" and their sculpture was compared with *Panopaea gurgitis* (Brongniart). The posterior end of one specimen and the posterior dorsal side of the other are damaged. Plaster casts of the two fossils presented by the late Dr. Bernoulli of the Basel Museum show that they are specifically

identical with the Chimbu material which is well enough preserved to show all features required for generic identification.

Cymatoceras hendersoni (R. Etheridge Jr.)

Text fig. 3a-c

Nautilus hendersoni R. Etheridge Jr. (MS.) in Jack and Etheridge, Geol. Pal. Queensland and New Guinea, 1892, p. 502.

Nautilus (*Cymatoceras?*) *hendersoni* R. Etheridge Jr. Queensland Geol. Survey Bull., 13, 1901, p. 34, pl. 1, fig. 1-2, pl. 2, fig. 1-3.

Nautilus (*Cymatoceras?*) *hendersoni* R. Etheridge Jr., Contr. Pal. South Aust., No. 14, 1905, p. 16, pl. 1, fig. 6-9, pl. 3, fig. 9-12.

Eutrephoceras hendersoni (Etheridge), Teichert, J. Paleont., vol. 26, p. 737.

Cymatoceras sp. Edwards and Glaessner, Proc. Roy. Soc. Vict., vol. 64, 1953, p. 98.

Material: Three incomplete casts, one with some of the outer shell well preserved.

Description: The best preserved specimen, about 150 mm. in diameter and 100 mm. wide, shows the distal half of the outer whorl enclosing the complete inner whorls. It is septate throughout. Only a small portion of the surface of the shell is visible. There are eight to nine septa in each of the preserved half whorls. The suture line consists of a wide ventral saddle, a shallow rounded lateral lobe, a high and undulating umbilical saddle. There is a small annular lobe, the whorl section is regularly rounded, the height being about three-fifths of the width. The venter is gently arched. The umbilicus is deep and narrow. The siphuncle is centrodorsan where the height is about 63 mm.

Another specimen which must have reached a diameter of over 200 mm. is poorly preserved but shows surface sculpture consisting of fine wavy ridges with a wide lateral forward sweep. They are unequal in strength and spacing, giving on the whole the impression of being somewhat accentuated at intervals of about 5 mm. These ridges are seen only on the outer surface of the shell which is thick. Very fine longitudinal striae can be seen only with a hand lens.

The third specimen is smaller, 87 mm. in diameter, and much worn. It shows clearly 16 septa in the last whorl.

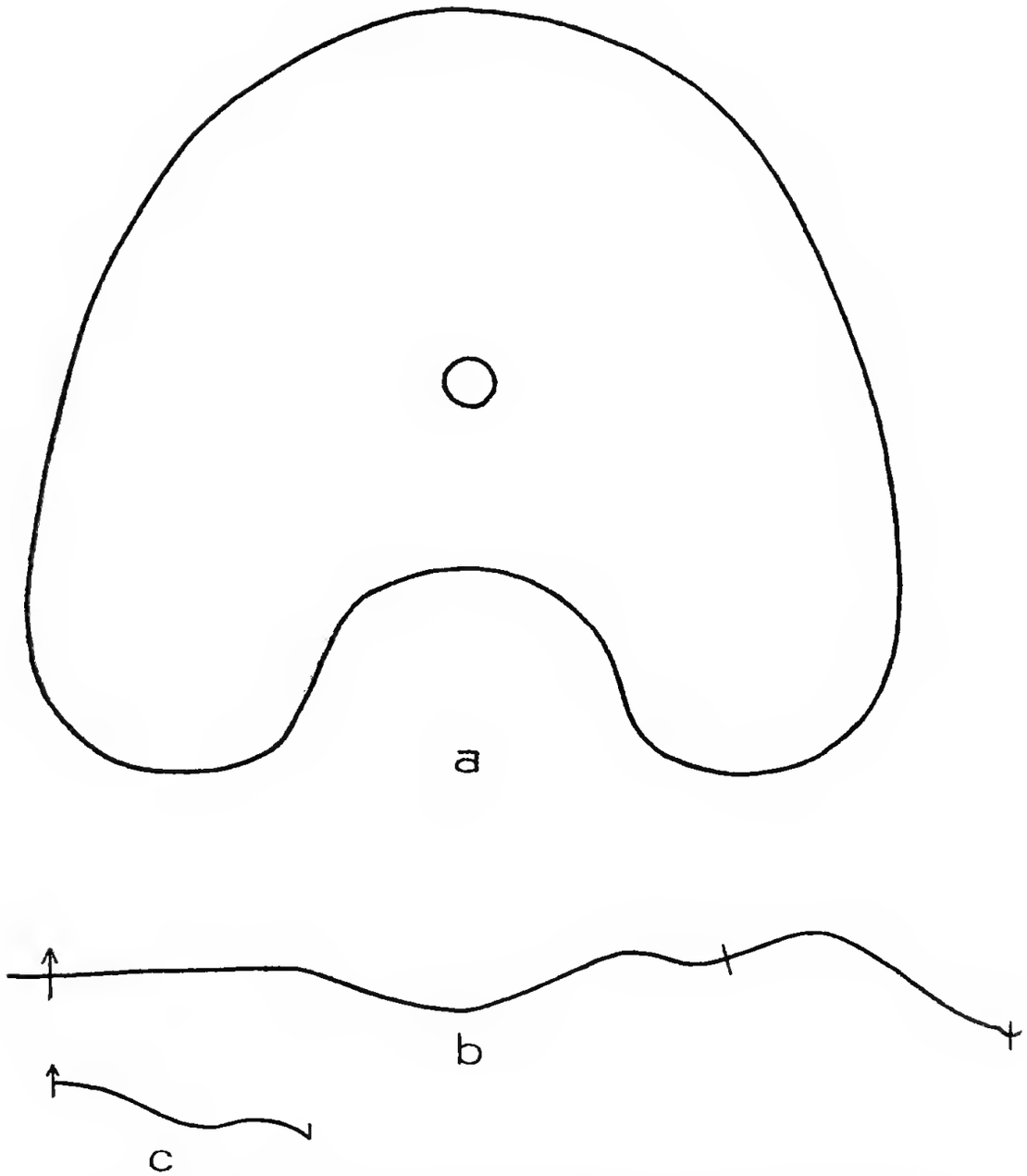

Fig. 3. *Cymatoceras hendersoni* R. Etheridge jun. a. Septal view, b. mature suture, c. Juvenile suture.

These specimens agree well with Etheridge's description of the Queensland species, particularly in the general shape and the delicate sculpture. The umbilical lobe seems to be more strongly expressed in the present specimens but as Etheridge did not draw the suture line and only figured it on a cast in which the edges of the chambers were damaged, the significance of this possible difference is uncertain.

Occurrence: The figures represent characters of a specimen found in a concretion in shale, outcropping in Kubukirua Creek, west of Knage Village, 5 miles northeast of the Wahgi-Purari Junction, Eastern Highlands, New Guinea (Coll. G. A. V. Stanley). Other specimens were found by natives near Masul Village, 3 miles east-south-east of Chimbu airstrip, Central Highlands of New Guinea.

Age: The age of the specimen from near Knage is Albian. It was found together with *Aucellina gryphaeoides*, and a foraminiferal fauna of Albian age occurs in close proximity. The specimens from near Masul were received together with *Chimbuites* but other fossils indicating younger (Cenomanian) age (*Mantelliceras* and *Turrilites*) were also obtained from natives in this vicinity.

Remarks: Another species of *Cymatoceras* occurs in the Cenomanian greensands with *Acanthoceras* in the Kerabi Valley. It can be distinguished by its much more sinuous costae which are separated by narrow sharp furrows. There are also very fine longitudinal ventral furrows spreading out laterally. The only known specimen measures 47 mm. in diameter.

Chimbuites Casey and Glaessner gen. nov[4]

Type species: *C. sinuosocostatus* Casey and Glaessner nov. sp.

Diagnosis: More or less involute. Whorls subrectangular in section, with flattened sides, rounded ventro-lateral shoulders and feebly convex venter. Umbilical wall steep, smooth, but with rounded rim. Costation of flexuous primary ribs, thickened on the lower half of the flanks and terminating at the umbilical margin, alternating with groups of secondary ribs. Secondary ribs end mostly at mid-flank; others make low-angle bi- or tri-furcation from the primaries. Ribs traverse the venter with a forwards sinuosity, their regularity interrupted by periodic, shallow, vestigial constrictions, confined to the venter and the outer half of the flanks. Suture line with narrow, subsymmetrically trifid lateral lobes, and numerous auxiliaries declining with gentle obliquity to the umbilicus.

This new genus is to be placed in the Family Hoplitidae *sensu lato* and is allied to the genera *Uhligella* Jacob, *Lemuroceras* Spath, *Cymahoplites* Spath, *Puzosigella* Casey and *Pachydesmoceras* Spath.

(4) The description and discussion of this new genus was contributed by R. Casey who also reviewed the description of its type species. I wish to thank Mr. Casey for his valuable contribution (M.F.G.).

These are all heavily ribbed derivatives of the Desmoceratacеae which connect that superfamily with the Hoplitaceae. *Uhligella* has much blunter ribbing and the ribs are raised into bullae at the umbilical margin on the inner whorls. *Lemuroceras* and *Cymahoplites* are more compressed, the umbilical wall is oblique and the costation different. *Puzosigella* has a more distinct rim to the umbilicus, which on the early whorls is surmounted by obtuse bullae, the inner half of the flank tends to become smooth at the size of the New Guinea specimen, and the suture line has the reduced number of auxiliaries and umbilical retraction of *Puzosia*. *Pachydesmoceras* has more numerous, finer, secondary costae on the inner whorls which rarely branch from the primaries; on the outer whorls the costation simplifies by reduction in the proportion of secondaries to primaries and bifurcation is there more frequent.

Uhligella ranges from Upper Aptian to Middle Albian and is typically European (though the generic name has been used uncritically for ribbed desmoceratids from all parts of the world). *Lemuroceras* is top Lower to basal Middle Albian and is at present known only from India and Madagascar. *Cymahoplites* and *Puzosigella* are of about the same age; the former occurs in Central Russia, the latter in California. *Pachydesmoceras* is known mainly from occurrences in the uppermost Albian of Eurasia, but has been reported from the Lower Turonian of Japan and Cameroons.

Chimbuites sinuosocostatus Casey and Glaessner sp. nov.

Plate xxiv, fig. 3a-b; plate xxv, fig. 1a-b and 2, and text fig. 4

1953 *Deshayesites* n. sp. Edwards and Glaessner, Proc. Roy. Soc. Viet. vol. 64, p. 98.

Holotype: Adelaide University Geol. Dept. No. F15308.

Material: Eight specimens in varying states of preservation.

Description: Whorls thick, with slightly rounded flanks, and arched but flattened venter; umbilicus narrow. Greatest whorl thickness halfway between the mid-flank and the umbilical rim. Ribs gently sigmoidal on the flanks and continuous across the venter with a pronounced forward sinus. There are only 12-13 primaries which bifurcate somewhat irregularly about the middle of the whorl height, with intercalation of three to four rounded but distinct secondaries. There is little if any difference between primaries and secondaries across the venter. Fine growth lines appear on the surface of the shell. On the

last whorl of the largest specimen and on the body chamber of the holotype the ribs become flatter and less distinct. The suture is as described for the genus.

Measurements:

Specimen:	a		b (Holotype)		c		d		e		f	
	mm.	%	mm.	%	mm.	%	mm.	%	mm.	%	mm.	%
diameter	130	100	87	100	94.5	100	84	100	62	100	40.5	100
whorl height . .	60	46	43	49	44	46	40	47	32	51	20	49
whorl thickness	46	35	36.5	41	39	41	35	41	26.5	42	17	41
umbilicus	23	17	17.5	20	21	22	19	22	12.5	20	8.4	20

Remarks: All specimens are septate throughout but the largest shows the spiral suture extending another quarter whorl, apparently without septation. The holotype, which is intermediate in size, shows the body chamber over one-third of the last whorl. There is little

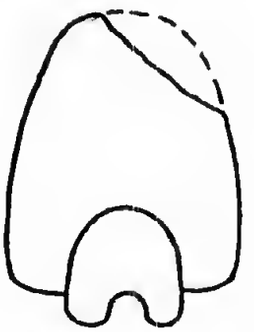

Fig. 4. *Chimbuites sinuosocostatus* Casey and Glaessner n. g., n. sp. Whorl section, A.U.G.D. No. 15311.

variation in ribbing, inflation, or width of umbilicus over this size range but the sculpture becomes weaker and smoother on the body chamber of the larger specimens. The venter is more broadly rounded in smaller specimens and the inflation of the whorls near the umbilical margin is more pronounced in the largest specimen which is, however, somewhat deformed and abraded. The forward inclination of the primaries seems to increase with age. There is a slight variation in the depth of the ventral forward sinus but in all specimens in the present collection, except one, it is well formed. This exceptional specimen is preserved as a septate fragment of two whorls with a maximum height of about 30 mm., equal to that of the smallest measured specimen of *C. sinuosocostatus*. The ribs divide here closer to the venter. The external and lateral lobes are wider and the external saddle is more elaborate. This may represent another species.

Locality: Near Masul Village, about 3 miles east-south-east of Chimbu airstrip, Eastern Highlands, New Guinea, collected by natives probably from pebbles in a small local stream, and presented to a party led by Mr. G. A. V. Stanley in 1949.

Age: Probably Albian. The matrix of the holotype contains another fragmentary specimen and also abundant small gastropods.

Puzosia cf. planulata (Sowerby)

Plate xxv, fig. 3

cf. *Ammonites planulatus* Sowerby, Sharpe, Cret. Ammonites, Palaeontogr. Soc., 1855, pt. 2, p. 29, pl. 12, fig. 3 (non fig. 4).

Description: Two specimens of *Puzosia* have been found close together, one over 300 mm. in diameter and the other less than 35 mm. The smaller specimen is complete but the shell is only partly preserved and the distal umbilical portion of the body chamber is damaged. There are six constrictions. On the surface of the shell they form a rounded tongue-like ventral forward sinus which is marked proximally by a ventrally much widened and projecting smoothly rounded rib. On the internal cast the ribs are extremely faint and hardly noticeable. The distal edges of the constrictions are more strongly marked than the proximal edges. The ventral sinus is angular and almost interrupted. Spath (1923, p. 48) described *P. planulata* (Sowerby) as compressed, having a larger umbilicus than *P. communis Spath*, acute chevrons on the periphery, and more distinct costation. In these respects the small specimen agrees with *P. planulata* but in the absence of material for direct comparison and of sufficient literature on other species the identification must be left in doubt.

In the large specimen of *Puzosia* the outer whorl is septate throughout. One third of this whorl was lost and in the gap one third of the penultimate whorl is seen. At a diameter of about 300 mm. the height and width of the whorl are about 160 mm., at its proximal fracture they are about 112 mm. The diameter of the umbilicus is about 100 mm. The venter is more arched and the flanks are more rounded than in the small specimen. The ornamentation is similar but obsolescent and the ventral sinus is more rounded though not less pronounced.

Locality: Kubukirua Creek, west of Kuage Village, 5 miles north-east of the Wahgi-Purari Junction, Eastern Highlands of New Guinea.

Age: Albian.

Myloceras davidi Whitehouse

Plate xxvi, fig. 2-3

Crioceras sp. R. Etheridge Jr., Rec. Aust. Mus., vol. 7, 1909, p. 144, pl. 38, fig. 1-2.

Myloceras davidi Whitehouse, Mem. Queensland Mus., vol. 8, 1926, p. 235, pl. 37, fig. 2.

Material: Two incomplete specimens (coll. F. K. Rickwood).

Description: "Coiling crioceratid, whorls compressed; first whorls more loosely coiled than later; costae thin, numerous, with small papillate ventro-lateral tubercles; septal suture with rectangular saddles and deep very numerous L_1" (Whitehouse). This species is distinguished from others, according to its author, by the compressed shape of its shell and by the deep narrow lateral lobe of the septal suture. Both characters are well shown in the present specimens in which the costae are slightly flexed as in the holotype.

Locality: Vicinity of Sura Creek, south-east of Lake Tebera, Papua.

Age and distributions: This species is known from the Upper Albian Tambo Formation of Queensland. Its occurrence provides a further valuable link between the Albian faunas of Queensland and New Guinea.

Myloceras cf. flindersi (McCoy)

cf. *Ancyloceras flindersi* McCoy, Ann. Mag. Nat. Hist., ser. 4, vol. 20, 1867, p. 356.

cf. *Crioceras flindersi* (McCoy) (*partim*) R. Etheridge Jr., Rec. Aust. Mus., vol. 7, 1909, pl. 39, fig. 1-3.

cf. *Flindersites flindersi* (McCoy), Whitehouse, Mem. Queensland Mus., vol. 8, 1926, p. 237.

Material: Two fragments of the distal part of the shell, mostly preserved as casts (Coll. F. K. Rickwood: No. 226KH, with *Pseudavicula? sp.*; 245KH, with *Inoceramus sp.*).

Description: The fragments, both from the straight part of the shell, agree in size and development of ribs and nodes with Etheridge's figures. There is considerable irregularity in the height of insertion of secondary ribs. The tubercles are markedly elongate. The venter is

preserved in one speeimen but it is too badly erushed for an exaet deseription of its ornamentation. It was apparently much narrower than in Etheridge's speeimens.

Measurements: Dorso-ventral diameter 60-65 mm., transverse diameter about 25 mm. (deformed by eompression). Length of larger fragment about 80 mm.

Occurrence: Vieinity of Sura Creek, east-south-east of Lake Tebera, Papua.

Age: Albian.

Remarks: Spath (1938, p. 601) has placed the genus *Flindersites* Whitehouse in the synonymy of *Myloceras* Whitehouse.

Labeceras trifidum Whitehouse

Plate xxvi, fig. 4a-c

Crioceras sp. R. Etheridge Jr. in: Jaek and Etheridge, Geol. Pal. Queensland and New Guinea, 1892, p. 502, pl. 33, fig. 4.

Crioceras laqueus R. Etheridge jun., Rec. Aust. Mus. vol. 7, 1907, pl. 49, fig. 7, 9 (*non* fig. 8).

Labeceras trifidum Whitehouse, Mem. Queensland Mus. vol. 8, 1926, p. 228.

Material and preservation: Three specimens showing the terminal "hook". In one of them the collapsed straight portion and the aperture ean be seen, in another the entire body chamber from the last septum to the apertural margin is preserved. Both are from a greenish greywacke. The third specimen, from a grey shale, is distorted.

Description: The speeies was based on ineomplete specimens showing the "body chamber with prominent dorso- lateral tubercles from which very fine but prominent ribs trifurcate" (Whitehouse 1926, p. 228). This description of the ornamentation, as well as the reference to subcircular whorl seetion with flattened venter, fits the speeimens from New Guinea well. It is noted that the trifurcation is common but not regular; bifurcating ribs with and without tubercles occur also, as in the specimens figured by Etheridge. Some of the tubercles are very prominent, particularly in the area of strongest curvature. The apertural lappets are areuate and direeted slightly inward. They project 6 mm. beyond the straight ventral margin of the peristome in a specimen in which they are 12 mm. apart and in which the greatest width of the chamber is 17 mm.

Measurements: The distance between the aperture and an external tangent to the back is 32.5 mm. in a specimen in which the dorso-ventral and transverse diameter of the last septum are 13.2 mm. The other specimens are about the same size.

Occurrence: From the area north of the Middle Purari River, Papua. One specimen was found 5 miles north of a point on the river 6 miles below Hathor Gorge, the others are from the same area.

Age and distribution: This species is known from the Upper Albian of Queensland and South Australia. The genus is restricted to the Upper Albian.

Dimitobelus (Tetrabelus) macgregori (Glaessner)

Plate xxvi, fig. 5a-b and 6, text fig. 5

Tetrabelus macgregori Glaessner, Proc. Roy. Soc. Viet., vol. 56, pt. 2, 1945, p. 160, pl. 6, fig. 12.

Dimitobelus n. sp., Rickwood, J. Geol. Soc. Aust., vol. 2, 1955, p. 73.

Material: Holotype (Melbourne University Geol. Dept. No. 1876); two fragmentary rostra (Queensland University Geol. Dept. No. F14501-2, coll. W. D. Mott); one well-preserved small and seven larger fragmentary rostra. Of these, four represent the apical portion and three shows the phragmocone, two of them are partly embedded in the matrix, and one is free and very large (coll. F. K. Rickwood).

General remarks: The study of the new material has made it necessary not only to amend the description of the species but also that of the genus. The large new specimen (F15294) shows the phragmocone to a length of about 70 mm. (25 mm. maximum width), with the rostrum broken between the two main longitudinal grooves (see pl. xxvi fig. 5) so that the siphuncle is exposed between them. This proves that the main grooves are ventro-lateral, not dorso-lateral as I had stated in the original description of the species. This description was based on a comparison with an unnamed species of *Tetrabelus* from New South Wales (Etheridge 1902, p. 46, pl. 9, figs. 3-5, Whitehouse 1924, p. 415). A careful study of other species of *Tetrabelus* shows, however, that in *T. seclusus* and *kleini*, Blanford, Gürich, Spengler and in fact Whitehouse had considered that two deeply incised furrows correctly as ventro-lateral. This is clearly seen to be the position in relation to the siphuncle in a specimen from Mountain Well, Onepah Station, 30 miles north-north-west of Tibooburra, New South Wales (Coll. H. O. Fletcher,

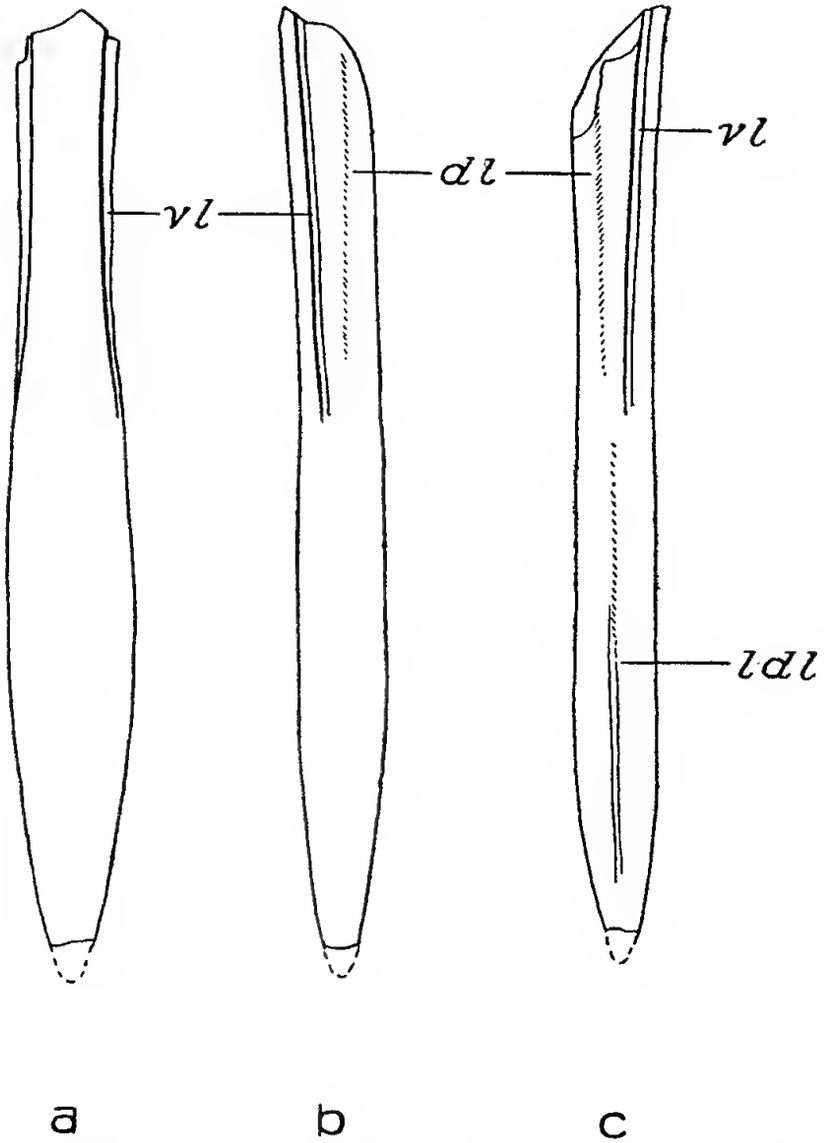

Fig. 5. *Dimitobelus* (*Tetrabelus*) *macgregori* (Glaessner). Holotype. a. Ventral view. b. Left lateral view. c. Right lateral view. vl. Ventro-lateral grooves. dl. Dorso-lateral lines. ldl. Lateral double lines (left side covered with matrix).

Aust. Mus. No. F42263) which probably represents the form which was described but not named by Etheridge from the same area. Moreover, this relation of the same grooves to the siphuncle can also be seen in the specimen figured by Etheridge (1902a) as *Belemnites eremos* Tate from South Australia, though Tate, Etheridge and Whitehouse had described them as dorso-lateral in this and other forms which are now placed in *Dimitobelus*. I have stated elsewhere (Glaessner 1957) that there is no evidence for this interpretation which must be abandoned.

Generic position: Although originally distinguished mainly on the assumed presence of dorso-lateral grooves the genus *Dimitobelus* should not be merged with *Peratobelus* in which only ventro-lateral grooves but no lateral double lines are present. *Tetrabelus* was believed by Whitehouse to be "a direct descendant of *Dimitobelus*, the line of division occurring at the stage when the ventro-lateral groove ceases to be dependent on the dorso-lateral, but has an independent existence (now disconnected from the lateral lines" (Whitehouse 1924, p. 414). His definition of the *Tetrabelus* is: "Clavate belemnites with dorso-lateral grooves and lateral lines, but having, in addition, independent ventro-lateral grooves". In *Dimitobelus* the ventro- (not dorso-) lateral grooves merge (after a swing towards the dorsal side) with the lateral lines, and a dorso (not ventro-) lateral anterior extension of these lines may also be present. This makes the separation ("independence") of the ventro-lateral grooves from the lateral lines the main distinguishing feature, not the two pairs of lines (see Whitehouse's fig. 3). Etheridge's species, however, and the new specimen from New South Wales do not show this separation although in other characters they resemble *T. kleini* and *T. seclusus*. It is therefore preferable to consider *Tetrabelus* a subgenus of *Dimitobelus*.

Description: Rostrum clavate, strongly constricted in the alveolar region, dorso-ventrally compressed, particularly where it expands to its greatest width. Ventro-lateral grooves deeply incised and sharply defined, extending well below the protoconch, straight but directed towards a lateral position at their posterior end where they approach the fine lateral double lines. Dorso-lateral lines weakly impressed in the alveolar region. Apex tapering gradually. The compression of the rostrum seems to increase during growth. The alveolar angle is about 15°, increasing slightly anteriorly. The bulbous protoconch is about 0.55 mm. wide and 0.4 mm. long, the following chamber of the phragmocone is 0.25 mm. long. The ratio of maximum transverse to maximum dorso-ventral diameter of the clavate portion of the rostrum is 1.3 in five specimens, 1.4 in one, and 1.2 in the smallest individual.

Comparison: This species resembles closely *D. diptychus* (McCoy) (=*B. canhami* Tate) but differs in the less clavate shape of the rostrum and in the less intense dorso-ventral flattening, the mean ratio of the maximum transverse to the maximum dorso-ventral diameter being 1.3 (range 1.2—1.4), as compared with 1.4—1.5 in *D. diptychus*. It appears from a study of type specimens in the collections of the University of Adelaide that the forms described by Etheridge from South

Australia as *Belemnites eremos* (R. Etheridge Jun., 1902, p. 51, pl. 7, fig. 18-21) should be included in *D. diptychus*.

Occurrence: Middle Purari River, Paw Creek and about 8 miles north-west; vicinity of Sebe Creek, east of Lake Tebera, Papua; Chim Valley, 2 miles north-west of Chimbu, Western Highlands of New Guinea (coll. F. K. Rickwood); Kerabi Valley, north-west of Mt. Murray, Papua (coll. W. D. Mott).

Age: Upper Albian and Cenomanian. The specimen (pl. xxvi, fig. 5) which was found about 8 miles north-west of the locality of the holotype was associated with *Myloceras* and *Labeceras trifidum*. Both these occurrences are in the Upper Albian. The specimens from the Kerabi Valley are associated with large *Mantelliceras* and other Acanthoceratids in greensands. The specimens from near Lake Tebera were found in similar greensands, together with the *Linotrigonia* described above, stratigraphically above the fossiliferous Albian. The material from the Chim Valley came from a very hard shelly impure glauconitic limestone 1,500 feet below the top of the Chim Group, several thousand feet above the horizon of the fossiliferous Cenomanian "Maram" Shales which contain foraminifera in the Chimbu section and *Euomphaloceras* at Mingende about 7 miles west.

Rotularia spirulaeoides sp. nov.

Plate xxv, fig. 4a-b and 5-6

Material: Six specimens (Queensland University Geol. Dept. No. 1833, coll. R. A. Woodward), 5 specimens collected by W. D. Mott, including the holotype, Adelaide University, Geol. Dept. No. F15320.

Description: Shell small, discoidal, umbilicate on both sides. Whorls inflated, apico-basal diameter increasing rapidly up to the last whorl, radial diameter of the whorl increasing slowly. The earliest portion seen consists of two flatly trochospiral whorls followed by one or two planispiral adult whorls expanding above the blunt apex of the initial coil incompletely and somewhat irregularly involute on both sides, at first to about half the whorl height but finally becoming evolute and ending in a short tangentially projecting constricted tube. Peripheral margin with a single broadly rounded keel, externally separated from the body of the whorl by shallow but clearly marked grooves which are about equidistant from the umbilical and peripheral margins. Surface showing arcuate growth lines concave towards the aperture above and below the lateral groove in which the direction of curvature is reserved. Irregularities of growth tend to produce alternating

umbilical constrictions and ribs. The coiling is sinistral (in the sense of Cox 1953, not of Wrigley 1951). In transverse section the inner tubular space is circular, with a dense inner and a layered outer wall which is very thick along the umbilical edge, and with a thin brownish "epidermal" covering.

Measurements: Diameter up to 21 mm., greatest thickness of last whorl in largest specimen 7 mm. diameter of tube 2.7 mm.

Comparison: The species differs from "*Tubulostium*" *discoideum* Stoliczka (Cenomanian of Southern India) in the rounded peripheral keel, the periphery in the Indian species being truncated. The new form resembles "*Rotularia*" *spirulaea* (Lamarck) very closely in shape and surface sculpture but differs in the lower and more rounded keel and the depressed early whorls which according to Rutsch (1940) often project above the adult coils in that common European Eocene species. In the new form the early whorls are lower than in "*Rotularia*" *clymenioides* (Guppy) from the Eocene of the Antillean Region. Other differences are the gradual transition to the planispirally coiled part of the shell and the greater thickness of the flanks at the level of the periphery of the preceding whorls in the new species. The forms described by Gardner (1939) from the Eocene of the Gulf Province of North America differ in surface sculpture and the development of the peripheral keels.

The new form differs from "*Spirulaea*" *gregaria* R. Etheridge Jr., in that the latter is concavo-sub-convex, and the periphery is not ridged or angled. In "*Tubulostium*" *ornatum* Wilckens from New Zealand the peripheral keel is separated from the lateral bulging zones by two much more pronounced furrows. "*T.*" *fallax* Wilckens from the Senonian of the Antarctic has a triple peripheral keel. *R. australis* Cox is smaller than *R. spirulaeoides*, being 14 mm. in diameter, and appears to be less involute and more discoidal, and the straight section of the tube is longer.

Taxonomic position: The taxonomy and nomenclature of the group to which the new species belongs has been discussed extensively in recent years (Gardner 1939, Rutsch 1939, Wrigley 1951, Cox 1953). While Rutsch has argued in favour of considering these fossils as gastropods and of applying to them the name *Tubulostium*, Wrigley has shown conclusively that the earliest stage of formation of the tube, which is rarely preserved, has the character of a worm tube. Wrigley's arguments in favour of the application of the generic name *Rotularia* Defrance 1827 instead of *Tubulostium* Stoliczka 1867 (which may

replace it if the prior use of *Rotularia* by Lamouroux in 1822 is confirmed) were accepted by Cox (1953).

Locality: Kerabi Valley, north-west of Mt. Murray, Papua.

Age: The genus ranges from Albian to Lower Oligocene. The association of the new species with *Mantelliceras* and other Acanthoceratids places it in the Cenomanian.

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EXPLANATION OF PLATE FIGURES

PLATE XXIV

Fig. 1a-b. *Aucellina gryphaeoides* (Sowerby). 1a. Left valve, internal mould, A.U.G.D. No. 15312, x1.8. 1b. Right valve, internal mould, A.U.G.D. No. 15313, x1.4.

Fig. 2a-c. *Pleuromya cuneata* n. sp. Holotype, A.U.G.D. No. F15300. Nat. size.

Fig. 3a-b. *Chimbuites sinuosocostatus* Casey and Glaessner n.g., n. sp. Holotype, A.U.G.D. No. F15308. Note regeneration of damaged shell flank in Fig. 3b. x0.77.

PLATE XXV

Fig. 1a-b. *Chimbuites sinuosocostatus* Casey and Glaessner, n.g., n.sp. Paratype, A.U.G.D. No. F15311. Nat. size.

Fig. 2. *Chimbuites sinuosocostatus* Casey and Glaessner, n.g., n.s. Paratype, A.U.G.D. No. 15310. x0.57.

Fig. 3. *Puzosia cf. planulata* (Sowerby). A.U.G.D. No. 15315. Nat. size.

Fig. 4a, 4b, 5, 6. *Rotularia spirulaeoides* n. sp. Fig. 4a, b. Holotype, A.U.G.D. No. 15320, x1.4. Fig. 5. Paratype, A.U.G.D. No. 15321, x1.5. Fig. 6. A.U.G.D No. 15322, x1.9.

Fig. 7a, 7b, 8, 9. *Linotrigonia* (*Oistotrigonia*) *lima* n. sp. Papua. Fig. 7a, b. Holotype, A.U.G.D. No. F15324, nat. size. Fig 8. Paratype, damaged left valve showing spinose sculpture, A.U.G.D. No. 15325, 0.9 nat. size. Fig. 9. Plastotype of external mould of young left valve, A.U.G.D. No. 15326, x1.4.

PLATE XXVI

Fig. 1a, b. *"Trigonia" papuana* n. sp. Right valve, holotype, Q.U.G.D. No. 17914. Nat. size.

Fig. 2, 3. *Myloceras davidi* Whitehouse. Fig. 2. A.U.G.D. No. F15317. 0.8 nat. size. Fig. 3. A.U.G.D. No. F15318. 0.7 nat. size.

Fig. 4a-c. *Labeceras trifidum* Whitehouse. Complete body chamber, internal mould with shell remnants. A.U.G.D. No. F15293. Nat. size.

Fig. 5a, b. *Dimitobelus* (*Tetrabelus*) *macgregori* (Glaessner). Fragmentary rostrum, A.U.G.D. No. F15294. Fig. 5a. Proximal portion of incomplete rostrum. The part covering the phragmocone has been removed to show the siphuncle and the smooth "splitting surfaces" between the ventro-lateral grooves and the phragmocone. Fig. 5b. Showing transverse section, upper half of periphery indented by ventro-lateral grooves. Nat. size.

Fig. 6. *Dimitobelus* (*Tetrabelus*) *macgregori* (Glaessner). A.U.G.D No. F15295. Split rostrum showing cast of protoconch and proximal portion of phragmocone in situ. x8.